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FUTURE IMPACT

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CONSULTING



P3 Autonomous Driving Market Insights

We analyze global autonomous driving ecosystems in Mobility-as-a-Service, Privately Owned Vehicles and Goods Transport.

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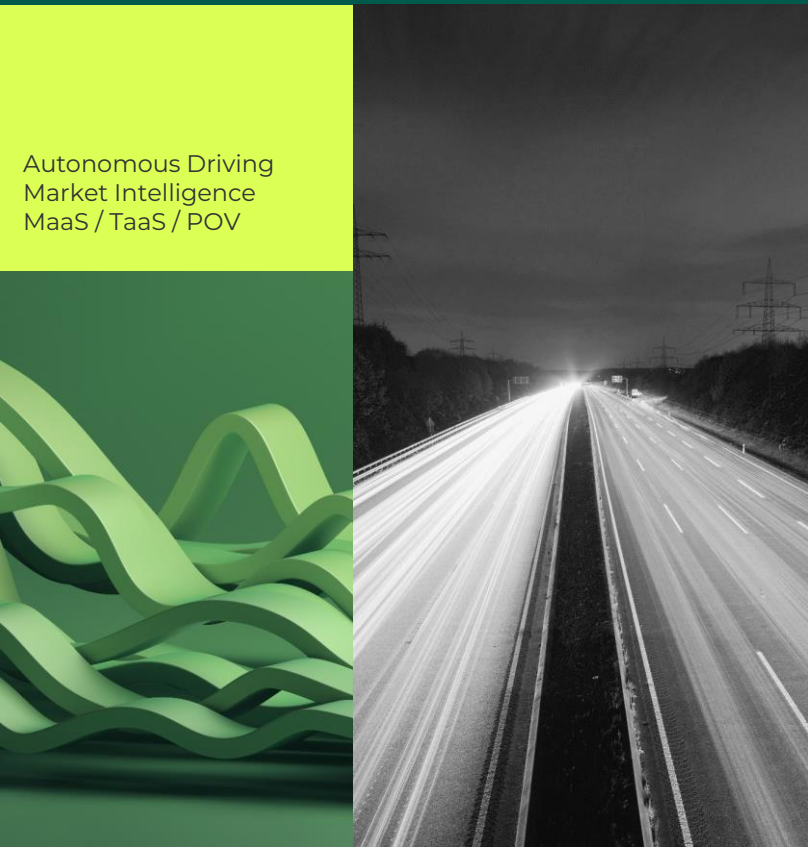
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www.p3-group.com



Autonomous Driving
Market Intelligence
MaaS / TaaS / POV

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P3 autonomous mobility



AD Market Insights – CN edition



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P3 & P3 autonomous mobility.

General Introduction



Portfolio as unusual.

SOFTWARE

Android Automotive

Business Intelligence

Cloud Migration

Cyber Security

Data Analytics

Enterprise Solutions

Financial Systems

IT-Architecture

Certifications

TECHNOLOGY

Autonomous Driving

Battery Technology

Electric Powertrain

Energy Solutions

Industrialization

Charging Infrastructure

Operations Excellence

Task Force Management

Testing & Engineering

CONSULTING

Agile Transformation

Artificial Intelligence

M&A Strategy

Marketing & Design

Sustainability

Project Management

"Organizational Strategy"

Quality & Compliance

Systems Engineering

UX/UI Design

Transformation

P3 advises leading international OEMs, suppliers, technology and insurance companies in the field of autonomous driving and autonomous mobility.



AUTONOMOUS MOBILITY
/AS UNUSUAL

>9

years of international
experience in autonomous
driving consulting

>100

customers worldwide and
more than 300 successful
AD projects

>50

employees around the
globe in the autonomous
driving space

75%

of the employees are
engineers and software
developers

We approach autonomous driving from many different perspectives. We understand the markets, know the players, but also have the technological know-how and the necessary software expertise.

Market & Strategy

- Go-to-market strategy
- Global market and competitive analysis for AD MaaS, TaaS & ownership
- MaaS & TaaS business model development incl. business case & TCO
- Competence analysis, assessment of “best-fit” partners
- (SDS) partnerships models and joint venture agreements
- AD shuttle / robotaxi and ADAS in-field testing & benchmarking

Technology & Regulation

- End-to-end architecture assessment and customization
- Cybersecurity, Functional Safety & SOTIF
- Regulation Implementation (AD SMS, SUMS & CSMS for SAE L3 & L4)
- Test Strategies & Management & Tool Confidence
- Sensor set evaluation and platform fortification strategies
- Support for Homologation (Type approval ODD and operation area)

Operations & Scaling

- AD Program Management incl. strategic setup, operations strategy, organizational build-up, project conduction & benchmarking
- Scaled Pilots: setup and management of runup schemes for AD pilot projects
- AD Product Lifecycle Management AD Logistics Concepts - Conceptualization of market-ready TaaS products



P3 autonomous mobility. **Market & Strategy.**

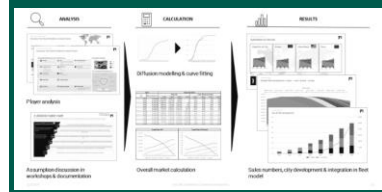
Introduction



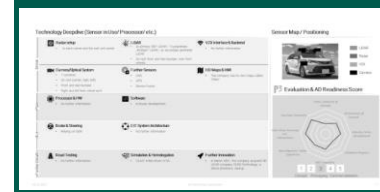
Overview | Our market, strategy, and technology intelligence portfolio.



SDS-Performance/ UX Benchmark



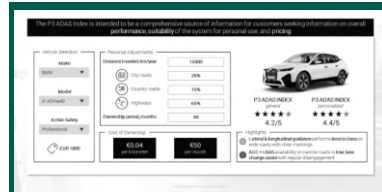
AD Market Models EU/US/Asia



Tech Stack & AD Readiness Analysis



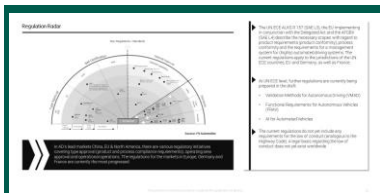
Go-to-Market Strategy



ADAS Benchmark



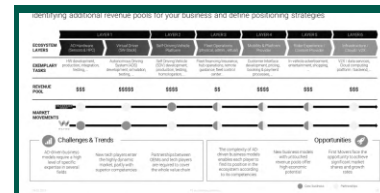
AV Fleet Simulation (MaaS & Trucking)



AD Regulation Radar EU/CN/US



TCO Calculations for MaaS Services



Value Chain and Positioning Strategy

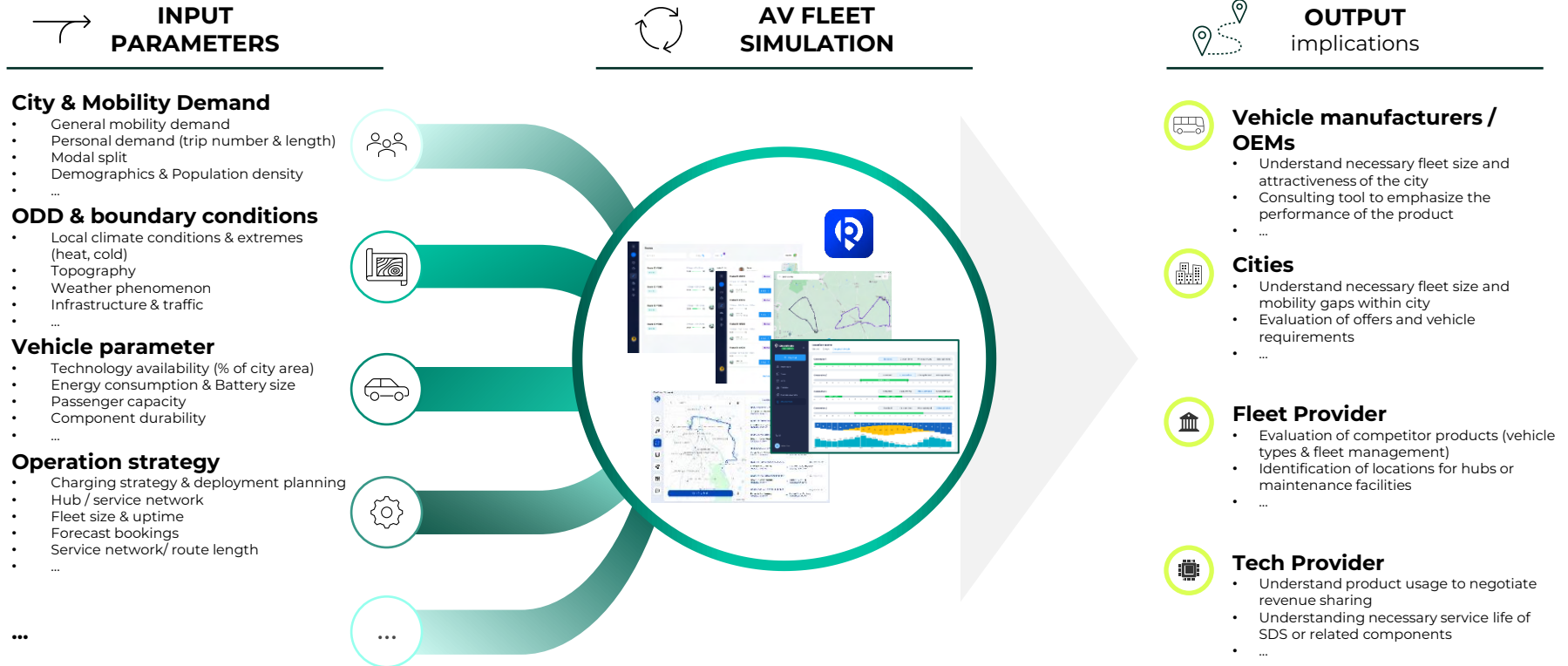
P3 AD market, strategy, and technology intelligence portfolio

Working closely with our Technology & Regulation and Operations & Scaling teams, we provide holistic market, competitor, and technology intelligence for your specific needs

We help our customers to master challenges and complexity and enter new or expand existing markets - with a clear guideline for a successful Go-to-market.



Our AV Fleet Simulation Tool enables companies to select the most promising G2M cities and understand business related KPIs by simulating future AV fleets.



From a holistic demand analysis to your individual tailor-made strategy: we are the right partner for your market entry and expansion.



360° Demand Analysis

In a first step, we jointly analyze and define your status quo, pain points and needs and sketch your future positioning and target picture in the AV ecosystem or specific market.

+



P3 AD Market & Strategy Portfolio

You have the needs; we have the solutions. We draw on our unique Market, Competitor, Customer, and Tech Intelligence portfolio as well as innovative software-solutions.

=



Tailor-made Strategy

We jointly develop your tailor-made go-to-market or market development strategy based on your capabilities and competencies and our long-term AV expertise.



P3 AUTONOMOUS MOBILITY MARKET & STRATEGY Overview | Our market, strategy, and technology intelligence portfolio



P3 AD Market Insights.



Let's start: P3 AD Market Insights Introduction.



Companies focusing on
autonomous **MaaS**



Companies focusing on
privately owned vehicles



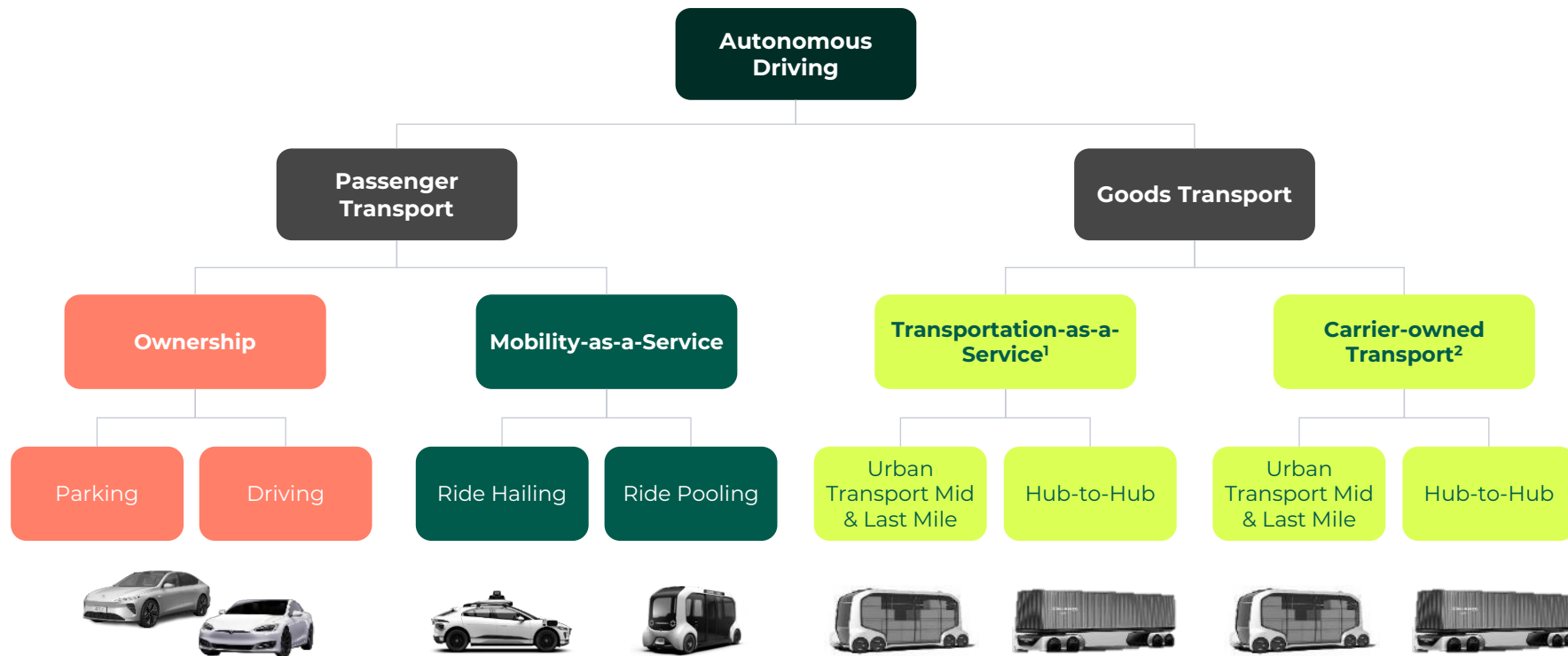
Companies focusing on **goods
transport and TaaS**

We **analyze** global Autonomous Driving **value creation networks and ecosystems** using **Layer Models** and **provide overviews** of **MaaS, ownership & goods transport use cases**

Based on their respective **core business**, we identify **(strategic) partnerships, investments** or **acquisitions** of **specific market players** and place them in the layer model. We focus on **North America, Asia** (China, Japan and Korea) and **Europe**

All **insights are based on publicly available sources**. Project knowledge or other **non-publicly available information is not considered**.
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Autonomous Driving Use Cases.



¹ Self-driving truck provider owns and operates the truck and offers transport / capacity on demand

² Customer / carrier owns and operates trucks and pays a per-mile fee to the SDS / truck provider

What you'll find in this report.

1 Mobility-as-a-Service (MaaS)

MaaS | **Intro**

MaaS | **NAR**

MaaS | **Asia**

MaaS | **Europe**

2 Privately Owned Vehicles (POV)

POV | **Intro**

POV | **NAR**

POV | **Asia**

POV | **Europe**

3 Goods Transport & Transport-as-a-Service (TaaS)

Goods Transport & TaaS | **Intro**

Goods Transport & TaaS | **NAR**

Goods Transport & TaaS | **Asia**

Goods Transport & TaaS | **Europe**



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Mobility-as-a-Service.

Intro | Use Cases & Layer Description



MaaS | Use Cases

			<div></div> <div>Gated Area</div> <div>Airport, factories, yards, harbors, ...</div>	<div></div> <div>Highway</div> <div>Highways, freeways, ...</div>	<div></div> <div>Urban</div> <div>City center, designated streets, ...</div>	<div></div> <div>Suburban</div> <div>Federal highway, residential areas, ...</div>	<div></div> <div>Rural</div> <div>Rural roads, gravel road, ...</div>
Ride Hailing	M		-	-	Robotaxi	Robotaxi	Robotaxi
	ML		low speed autonomous shuttle (<25km/h)	-	low speed autonomous shuttle (<25km/h)		
Ride Pooling	M		(private) robo shuttle	robo shuttle			
	L		(private) robo shuttle	robo shuttle			
	XL		(private) robo bus	robo bus			

MaaS | Layer Model Description



Self-Driving System (SDS) is the sum of all necessary systems to realize self driving level 4 (SAE).

Key functionalities are sensor data fusion, object detection, localization, prediction, environment interpretation, trajectory planning and actuator control.

The HW stack includes sensors, SoC and computing platforms, for example, while the SW stack covers the virtual driver, among others.

Self-Driving Vehicles are considered L4 ready vehicles with an integrated and homologated SDS (sensors, computing hardware and software), which operate in a specific ODD (Operational Design Domain).

Fleet Operators potentially own, operate and maintain a fleet of self-driving vehicles. It may be necessary that a fleet operator is responsible for fleet intelligence functions and technical supervision. Therefore, Layer 3 covers both physical and digital fleet operations.

The **Mobility Provider** owns the user frontend. It is point of sale and provider of the primary communication and interaction channel with the user. Thus, it is responsible for pricing, ride planning, ride execution and important for the overall brand experience.

The **Content Provider** for **Rider Experience** owns a software platform that acts as middleware to service partners. Digital content (e.g., media), digital products (e.g., productivity tools) and digital services are part of this platform.

The service area and its **infrastructure** are core elements to enable an AD service. Infrastructure includes the vehicles' IT infrastructure (especially cloud services and backend), V2X technology and takes into account human behavior prediction in that specific scenery.

MaaS | Layer Model Description











































































Exemplary tasks







































LAYER 1		LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 6
Sensor Set / SoC / Computing HW	SW-Stack / Virtual Driver	Self-Driving Ready Vehicle	Fleet Operations	Mobility & Platform Provider	Rider Experience / Content Provider	Infrastructure
HW development	SW development	Design & development	Fleet financing	Customer app	In-vehicle advertisement	Localization
HW production	Simulation	Redundant chassis	Insurance	API (Layer 1-4)	Shopping	3 rd party HD maps
Sensor integration	Prediction	SDS integration	Concessions	Rider authentication	Education	V2X
Automotive approval	SDS licensing	SDV testing	Charging	Pricing	Working	Data communication
Sensor testing & approval	SW testing & approval	After sales	Maintenance & cleaning	Booking	Multimodal connectivity	Cloud infrastructure
Sensor fusion	HD mapping	Production	Backend (Layer 1-4)	Dynamic routing	Gaming	Service area
...	Verification & validation	Logistics	Hub operations	Payment
	...	Sales channel	Fleet Control Center (fleet steering and monitoring)	Ticketing		
		Homologation	Driver sideline activities	Marketing & Sales		
		Pricing	Remote assistance	Customer support		
		...	Fleet intelligence (e.g., fleet & ride optimization)	Multimodal connectivity		
				
				...		




















































Mobility-as-a-Service. NAR.





Partnering & Value Chain, Level 4 Target & Latest News



LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5		LAYER 6				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider		Rider Experience/Content Prov.		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App		Entertainment & advertisement		3rd party HD Maps	Cloud	V2X & Others
 WAYMO	 	 WAYMO	 	    		   	 WAYMO	 WAYMO   	        	Not announced				
 STROBE  ASTYX  OUSTER	 	 voyage  cruise		 gm  HONDA			 cruise	 cruise   	Not announced		 Microsoft			
 LUMINAR  in mobileye  ZF	 in mobileye	 in mobileye™		 NIO  HOLON  SCHAEFFLER  Lohr  VW  Continental  MANN		 holo  Marubeni  moovit  beep  WILLER  Transdev  SIXT  SIXT  FMT	 moovit  Ruter#  WILLER  Transdev  SIXT  SIXT  SIXT  FMT	 moovit	Not announced					
Core Business	Partnership or supplier deal	Investment	Acquisition	Parent / Subsidiary	Update									

LAYER 1				LAYER 2		LAYER 3		LAYER 4	LAYER 5	LAYER 6		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider	Rider Experience/ Content Prov.	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
    				 								
 	 			 				  				   
 								 				
								Not announced				

LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5		LAYER 6				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider		Rider Experience/ Content Prov.		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App		Entertainment & advertisement		3 rd party HD Maps	Cloud	V2X & Others
 				   	 	  	  	    	Not announced	Not announced				
  			 	    		   		Not announced	Not announced					
 				 		 	  		Not announced		 			

LAYER 1		LAYER 2		LAYER 3		LAYER 4	LAYER 5	LAYER 6				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider	Rider Experience/ Content Prov.	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
<div><div> Ouster</div><div> LidderTech</div></div>	<div> Horizon Robotics</div>	COAST		COAST		COAST		Not announced	Not announced			<div> dg:Cityes</div>

At a glance



Working **15+ years** towards **autonomous driving**, Waymo's virtual driver is the world's **most experienced one**. The fully driverless I-PACE fleet in Phoenix, SF and LA impresses with a **terrific system performance**. In our view and bases on our benchmark rides, Waymo is **currently ahead of competition** in the AV space.



Cruise operated a **commercial robotaxi service** in **San Francisco**, which is currently not **available due to several incidents involving its robotaxis and both trust & acceptance issues and lost permits**. Recently, Cruise re-started supervised autonomous driving with safety drivers in Phoenix.



Mobileye is **testing its AV fleet in various locations around the globe**, including complex European traffic. First promising **pilot projects in Norway (Oslo) and Germany are to come** - these **will show what the system is capable of** and how well it performs compared to competitors.



While Aurora shifted its **focus primarily to self-driving trucks** some time ago, it has been **quiet about its robotaxis**. We believe: the **company needs a working business case**, otherwise it will become a victim of market consolidation. MaaS is therefore probably not part of the business for now.

Latest news

Waymo and Uber expand partnership to bring autonomous ride-hailing to Austin and Atlanta.

(13.09.2024)

[Update](#)
[Read](#)

Cruise robotaxis return to the Bay Area nearly one year after pedestrian crash.

(19.09.2024)

[Update](#)
[Read](#)

Mobileye to end internal Lidar development.

(09.09.2024)

[Update](#)
[Read](#)

Self-driving vehicle company Aurora cuts 3% of its workforce.

(24.01.2024)

[Read](#)

L4 target

L4 achieved in Phoenix by **2020**.

L4 achieved in SF by **2022**.

Not announced

Not announced

At a glance



JV of Hyundai and Aptiv, while the latter reduced its common equity interest from 50% to about 15% by end of March 2024. In this course, **Hyundai has agreed to invest nearly \$1 billion in Motional by 2024**. The demise of Motional has thus been averted for the time being.



Zoox is **meanwhile testing its SPV on public roads in the bay area**. Currently, only employees are eligible to take rides. Many people are waiting for the service to be opened up to the public - and so are we.



May's fleet is already **available to the general public** in many cities. The **SDS is designed for multiple vehicle platforms** and used in the Toyota Sienna Autono-MaaS vehicles, among others. The approach to enhance public transport instead of offering robotaxi services is pretty unique in the US



Perrone been **developing autonomous vehicle solutions since 2003**. Apart from its low-speed shuttles, Perrone claims to have **outfitted over 30 vehicles types with its retrofit kit**. Despite its experience, we don't believe Perrone will become a leading market player.

Latest news

CEO of self-driving startup Motional is stepping down.

(18.09.2024)

[Update](#)
[Read](#)

Zoox to test self-driving cars in Austin and Miami.

(05.06.2024)

[Read](#)

May Mobility and SouthWest Transit announce first autonomous microtransit service in the Twin Cities area.

(08.07.2024)

[Read](#)

Perrone Robotics to deploy fleet of Autonomous Ford E-Transit vans for Detroit's 'Connect' program, a two-way 10-mile autonomous vehicle shuttle route.

(02.04.2024)

[Read](#)

L4 target

2026

Not announced

L4 achieved in Sun City by late **2023**.

Not announced

At a glance



Unlike most MaaS providers, ADASTEC is not focusing on robotaxis but developing an **AV stack for transit buses**, which marks a USP in the market. ADASTEC has deployed buses in several locations including the US and Europe.



The company provides MaaS solutions for cities, theme parks, campuses, airports, rail yards, and other private sites. In the meantime, **COAST seems to be focusing primarily on use cases other than passenger transport** (e.g., harvesting, ports). However, transport currently seems to be the primary use case.

Latest news

Karsan launches Autonomous e-ATAK for driverless public transport in Switzerland!.

(19.08.2024)

[Update](#)
[Read](#)

COAST Autonomous announces collaboration with the city of Winter Haven, Florida to explore deployment of autonomous transportation solutions.

(30.03.2022)

[Read](#)

L4 target













































































































































































































































































































































































































Not announced

Not announced









































Mobility-as-a-Service. Asia.










































Partnering & Value Chain, Level 4 Target & P3 Assessment

















LAYER 1				LAYER 2		LAYER 3		LAYER 4	LAYER 5	LAYER 6		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider	Rider Experience/ Content Prov.	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
       	       	       		                     	                     	                     	                     	                     	                     	                     	                     	
              	              	             		              	              	              	              	              	              	              		
       	       	      		       	       	       						

LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5		LAYER 6			
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider		Rider Experience/ Content Prov.		Infrastructure	
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others	
<div>autox</div> <div></div> <div>arbe</div> <div>robosense</div> <div>dji</div> <div>SILC</div>	<div></div>	<div>autox</div>		<div></div> <div></div> <div></div> <div>HONDA</div> <div></div> <div></div> <div></div>		Not announced		<div>autox</div> <div></div>	Not announced				
<div></div> <div></div> <div>Valeo</div> <div></div>	<div></div>		<div>Valeo</div> <div></div>	<div></div> <div></div> <div>TOYOTA</div> <div></div> <div></div> <div></div>	<div></div>	<div></div>		<div></div>	<div></div> <div></div>				
<div></div> <div></div> <div>ZVISION</div> <div>robosense</div>	<div></div>		<div></div>	<div></div> <div></div>	<div></div> <div></div>	Not announced		Not announced		<div>Tencent 腾讯</div> <div>SD maps – probably consumer vehicles only</div> <div></div> <div></div>			
Core Business Partnership or supplier deal Investment Acquisition Parent / Subsidiary Update													









LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5		LAYER 6						
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider		Rider Experience/ Content Prov.		Infrastructure				
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App		Entertainment & advertisement		3 rd party HD Maps	Cloud	V2X & Others		
<div>robosense</div> <div> HESAI</div>	<div> Horizon Robotics</div> <div> Continental</div> <div> NVIDIA</div> <div> NXP</div> <div> UAES</div> <div> intel</div>	<div> MAXIEYE</div> <div> MINIEYE</div> <div> UNTUCH</div> <div> Zong Yimu</div> <div> 轻舟智能 QCRAFT</div> <div> JF 京丰科技</div> <div> nulimax^{ad}</div>	<div> ThunderSoft</div> <div> WINDRVR</div> <div> STRADVISION</div>	<div> VOLKSWAGEN GROUP</div> <div> 理想</div> <div> gm</div> <div> GWM</div> <div> 广汽本田</div> <div> 广汽丰田</div> <div> BYD</div> <div> 小鹏</div> <div> 蔚来</div> <div> AION</div> <div> 广汽传祺</div> <div> 奇瑞</div> <div> 江淮</div> <div> BAIC</div>	<div></div>	Not announced		Not announced		UNTOUCH 未动科技		APTIV		NAVINFO		
Not relevant		<div> WeRide 智行者</div> <div> pony^{ai}</div>		<div> 广汽</div> <div> WeRide 智行者</div> <div> pony^{ai}</div> <div>ONTIME integrates 3rd party fleets</div>	<div></div>	<div></div>		Not announced		Not announced						

LAYER 1				LAYER 2		LAYER 3		LAYER 4	LAYER 5	LAYER 6		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider	Rider Experience/ Content Prov.	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
  		    		 	 			 		 		
    	 	   						 		 		
	 	 		 								

LAYER 1				LAYER 2		LAYER 3		LAYER 4	LAYER 5	LAYER 6		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider	Rider Experience/ Content Prov.	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
		 Yukuang Tech TIER IV		 pix moving	 elaphe TIER IV SODA	 Yukuang Tech		 Jing Cloud JING		Not announced	Not announced	
		 NISSAN	 Applied Intuition						 Easy Ride			
 WeRide		 WeRide		 YUTONG			 WiTricity					



LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5		LAYER 6			
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider		Rider Experience/ Content Prov.		Infrastructure	
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others	
<div><div></div><div>42dot</div></div>		<div>42dot</div>		<div><div></div><div>42dot</div></div>		<div><div></div><div>42dot</div><div>GEOTAB</div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	Not announced			Not announced	
<div><div></div><div>AISIN</div><div>DENSO</div><div>Cracking the Code</div><div></div><div>robosense</div></div>	<div><div></div><div>QVCC</div><div></div><div>pony.ai</div><div></div><div>Apex.AI</div><div>lyR</div><div>Level 5</div><div></div><div>motomota</div></div>	<div><div></div><div>parallel domain</div><div>Apex.AI</div></div>		<div><div></div><div>TOYOTA</div></div>		<div><div></div><div>RIDECELL</div></div>	<div><div></div><div>Uber</div><div></div></div>	Not announced	<div><div></div><div>9tomtom</div><div>NTT DATA</div><div>MAXAR</div><div></div><div></div><div>here</div></div>	<div></div>	<div></div>		
<div><div></div><div>Motional</div><div></div><div>ZENDAR</div><div></div></div>	<div><div></div><div>Aurora</div><div>pony.ai</div><div>42dot</div><div>Baidu</div><div>IONQ</div></div>	<div><div></div><div>Motional</div></div>		<div><div></div><div>HYUNDAI</div><div>MOTOR GROUP</div></div>		<div><div></div><div>Not in service anymore</div></div>	<div><div></div><div>Grab</div><div>AIR S</div><div>i.M</div></div>	Not announced	<div></div>				

LAYER 1				LAYER 2		LAYER 3		LAYER 4		LAYER 5		LAYER 6		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider		Rider Experience/ Content Prov.		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App		Entertainment & advertisement		3 rd party HD Maps	Cloud	V2X & Others
	 Cutting the Cost	TIER IV	TIER IV	 gix moving	TIER IV			 NIHON KOTSU		Not announced		Not announced		
				 TOYOTA										
TIER IV				 Innovation by Chemistry										

At a glance



Baidu Apollo has accumulated **more than 100m km**, holds **permits for first fully driverless taxi service** in CN and **processed >6m autonomous ride orders** by April 2024. Baidu is an absolute heavyweight in the Chinese AD market and, in our view, the current leading company in China.



WeRide was the **first AD company in China** to operate a fleet with **>100 vehicles** for AD testing and was permitted to test **fully driverless cars** both in **China** and the **USA**. Considering >20mn autonomous kilometers, WeRide is among the strongest AD players. WeRide also offers L2+ solutions.



Pony.ai has driven **>30mn testing and operations kilometers on urban roads & highways**, holding **permits to offer driverless rides in China and test its AVs in the US**. Pony also offers L2+ solutions to OEMs. As the BC for AD MaaS will remain negative in the medium term, that's a reasonable move.



AutoX's **focus is on China and the Asia Pacific markets**. However, it also holds a permit to **transport passengers on public roads** in California. With a fleet of **more than 1000 vehicles in China**, AutoX is a **leading player** in this market.

Latest news

Hesai Technology serves as supplier of Baidu Apollo sixth-generation Robotaxi's primary LiDAR.

(17.07.2024)

[Read](#)

WeRide and Uber partner to bring autonomous vehicles to the Uber platform, beginning in the United Arab Emirates.

(25.09.2024)

[Update](#)

[Read](#)

Pony.ai starts testing autonomous cars on Guangzhou's newly opened expressways.

(04.09.2024)

[Update](#)

[Read](#)

AutoX's RoboTaxis allowed for unmanned passenger transport service in Shanghai.

(08.07.2024)

[Read](#)

L4 target

L4 reached in Guangzhou by **2021**

L4 reached in Guangzhou by **2022**

L4 reached in Beijing and Guangzhou by **2023**

L4 reached in Shenzhen by **2021**

At a glance



Following an 18-month suspension by the Chinese authorities, Didi was permitted to sign up new users by 2023. Its **active user base was 500mn** in 2020, receiving **>40 bn trip requests daily**. This means great market power - however, it has become **quiet around DiDi's AV division**.



DeepRoute claims to offer the most affordable SDS on the market. In the meantime, DeepRoute has covered **10 million autonomous kilometers** on public roads by 09/23 and holds permission to carry passengers in China. The current focus seems to be rather on L2+ ADAS than robotaxis.



Horizon Robotics now has **partnerships with many well-known OEMs and Tier1s** with whom they are **jointly developing autonomous driving functions based on their Journey chip**. It is therefore a very strong AI-chip market player, without focusing on deploying own robotaxi fleets.



ONTIME (Ruqi Mobility) was founded by GAC Group and Tencent. Its business scope in terms of robotaxis is an **operation platform including remote supervision, remote management, remote control and remote evaluation**. ONTIME integrates fleets from partners such as GAC and Pony.ai and had a fleet of >280 vehicles by December 2023.

Latest news

DiDi Autonomous Driving, GAC AION's joint venture to launch first L4 commercial Robotaxi in 2025.

(07.04.2024)

[Read](#)

Vehicles powered by DeepRoute's end-to-end intelligent driving model to hit market in 2024.

(18.03.2024)

[Read](#)

Horizon Robotics, Chery advance collaboration on Journey 6 smart computing platform.

(20.09.2024)

[Update](#)

[Read](#)

ONTIME starts commercial operations of Robotaxi in Zhuhai's Hengqin area.

(10.09.2024)

[Update](#)

[Read](#)

L4 target

2025

2025

Not announced

Not announced

At a glance



In 2021, **Geely and Waymo** teamed up to **integrate the Waymo Driver** into an autonomous ride-hailing Zeekr vehicle. This beauty was presented to the public by end of 2022. Geely **itself rather focuses on the POV business instead of MaaS**.



By August 2022, SAIC accumulated **400,000km of automated driving testing** in China. SAIC has **partnered with well-known SDS providers**, such as Momenta and Pony.ai, to develop self-driving vehicles.



FAW's focus is primarily on privately owned vehicles. However, **its EV brand Hongqi** and its **3rd-generation robotaxi** rides on the same platform as its mass-produced vehicle to achieve economies of scale. FAW **co-developed the Hongqi robotaxi with Baidu** and also **invested in tech company Pony.ai**.



PIX Moving shares the vision of rebuilding the city with a special form of vehicles called **Moving Spaces**. These **multi-functional pods** can serve as moving working spaces or vending machines, among others. Great concept for technology-driven Asian markets and beyond.

Latest news

Geely, Foretellix Enhance AV Safety.
(07.05.2024)

[Read](#)

SAIC-backed Xiangdao Chuxing kicks off Robotaxi pilot operation in Shenzhen.
(28.12.2022)

[Read](#)

Hongqi's 3rd-gen L4 Robotaxi allowed for unmanned road tests in Beijing.
(10.07.2024)

[Read](#)

PIX Moving and SODA.Auto announce strategic partnership to accelerate autonomous vehicle development.
(04.09.2024)

[Update](#)
[Read](#)

L4 target

Not announced

2025

Not announced

Not announced



At a glance



Nissan plans to offer **autonomous mobility services starting in Japan by 2027**, working closely with third parties such as local authorities and PTAs and relying on its **inhouse-developed, autonomous-drive system**. Initial trials started in 2024 with the goal to have 20 supervised demonstration vehicles on the roads between 2025 and 2026.



Yutong is China's top bus manufacturer and the world's largest one. For the AD MaaS Case, Yutong provides its **purpose-built electric robobus**, which is already operating driverless on public roads in cooperation with SDS provider WeRide. Yutong **will thus remain true to its core business**.



Acquired by Hyundai Motor Group in 2022, 42dot is the **groups' global software center**. 42dot and Hyundai showcased 'software-defined vehicle' (SDV) technologies under development to lead to a **'Software-defined Everything' (SDx) ecosystem beyond mobility** at CES 2024.



In the AD space, Toyota is **focusing primarily on partnerships, investments and acquisitions**. The extensive portfolio includes, for example, Lyft Level 5, Momenta, Pony.ai or May Mobility. Toyota and Pony.ai are developing a robotaxi fleet of about 1,000 vehicles.

Latest news

Nissan demos autonomous driving on streets of Yokohama.

(14.06.2024)

[Read](#)

WiTricity and YuTong Bus revolutionize public Transportation with Wireless Charging for Autonomous E-Buses.

(10.02.2023)

[Read](#)

Geotab, Kia, and 42dot join forces to drive the future of fleet management.

(12.09.2024)

[Update](#)
[Read](#)

Pony.ai teams up with Toyota China, GAC Toyota on Robotaxi development.

(04.08.2023)

[Read](#)

L4 target

2027

L4 reached by **2022** jointly with WeRide.

Not announced

2024



At a glance



Hyundai and Aptiv jointly established **Motional** to develop robotaxis. Moreover, the **acquisition of 42dot** is **intended to strengthen capabilities**. We are curious to what extent Hyundai, apart from Motional, will therefore position itself in the AD business in the future.

TIER IV



TIER IV is a Japan-based company **specializing in Autoware-based AD solutions**. The company aims to make autonomous mobility technology scalable and accessible, collaborating globally to **advance AVs for different industries**. TIER IV participates in projects such as METI aimed at deploying robotaxis for transportation and autonomous trucks for logistics.

Latest news

Hyundai Motor, Baidu join forces to co-advance in automotive intelligence development.

(28.04.2024)

[Read](#)

TIER IV tapped for METI initiative to develop robotaxis and autonomous trucks.

(20.08.2024)

[Read](#)

L4 target





















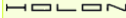

















2026 (Motional)

Not announced

Mobility-as-a-Service. Europe.












Partnering & Value Chain, Level 4 Target & P3 Assessment

P3

LAYER 1				LAYER 2		LAYER 3		LAYER 4	LAYER 5	LAYER 6		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider	Rider Experience/Content Prov.	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
				 Commercial Vehicles								
 		  No further announcements  		 			Not announced				 	
				 	 	   	   					
Core Business  Partnership or supplier deal  Investment  Acquisition  Parent / Subsidiary  Update												

LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5		LAYER 6				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider		Rider Experience/Content Prov.		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App		Entertainment & advertisement		3 rd party HD Maps	Cloud	V2X & Others
<div>Continental's</div> <div>OUSTER</div> <div>CEPTON</div>	<div>NVIDIA</div> <div>Continental's</div> <div>KALRAY</div> <div>MicroSys</div>	<div>EASY MILE</div>	<div>Ansys</div> <div>TRUST IN SOFT</div>	<div>STELLANTIS</div> <div>Renault Group</div> <div>IVECO</div>			<div>ottopia</div> <div>DriveU.auto</div> <div>APPLIED AUTONOMY</div>	<div>EASY MILE</div> <div>IOXI</div> <div>VIA</div>		Not announced		Not announced		
<div>OUSTER</div> <div>Valeo</div> <div>HESAI</div>	<div>NVIDIA</div>	<div>NAVYA</div>		<div>NAVYA</div> <div>bluebur</div> <div>tron-e</div>	<div>R3E</div>		<div>KEOLIS</div> <div>holo</div> <div>PADAM</div>	<div>KEOLIS</div> <div>PADAM</div>		Not announced		Not announced		
<div>NAVTECH</div> <div>HESAI</div> <div>ZF</div>	<div>NVIDIA</div>	<div>Google Cloud</div>		<div>Ford</div> <div>Applied EV</div> <div>NEVS</div> <div>eVersum</div>	<div>STREETDRONE</div> <div>ibott</div> <div>bp</div> <div>beep</div> <div>بایانات</div> <div>BAYANAT</div>	<div>STREETDRONE</div>	<div>ocado</div> <div>beep</div>		Not announced		<div>Tencent</div> <div>Google Cloud</div>			

LAYER 1		LAYER 2		LAYER 3		LAYER 4	LAYER 5	LAYER 6				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider	Rider Experience/ Content Prov.	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
								Not announced	Not announced	Not announced		
									Not announced	Not announced		
				 		 			Not announced			

LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5		LAYER 6				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider		Rider Experience/Content Prov.		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Passenger App	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others		
				  verne		verne		verne						
 									Not announced					
						Not announced		Not announced	Not announced				Not announced	
Not announced		 		Renault Group		Not announced		Not announced	Not announced				Not announced	
<div>Core Business</div> <div><div></div> Partnership or supplier deal</div> <div><div></div> Investment</div> <div><div></div> Acquisition</div> <div><div></div> Parent / Subsidiary</div> <div><div></div> Update</div>														

LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5		LAYER 6				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet Operations		Mobility & Platform Provider		Rider Experience/Content Prov.		Infrastructure		
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inmobility	inmobility			V2V	SCHAEFFLER	Not announced		Not announced	Not announced					
Not announced		motor		OMNIXAR	motor	Not announced		motor	Not announced			Not announced		

At a glance



Of all the European OEMs in the AD MaaS space, VWCV is the most ambitious one and advanced. VW **collaborated** and **tested with SDS providers early on**. After **Argo's shutdown**, VW announced **Mobileye** technology to be integrated into the ID.Buzz AD. Promising collaboration!



There is **no clear strategy in the AD MaaS case**. Volvo has committed to **develop robotaxis with Waymo** - nothing has happened since. Volvo seems to be focusing instead on the development of self-driving trucks with its partners.



Benteler established **HOLON as its new AD business unit**, working closely with SDS supplier Mobileye, fleet operator Beep to develop autonomous shuttles services based on HOLON's mover. As a non-OEM, bringing the vehicle to series production will be challenging – but SPVs will be a USP in the AD space.



EasyMile has been deployed vehicles >30 countries and >300 locations. the **EZ10 is the most widely used autonomous shuttle**. **ODD and SDS capabilities must be enhanced** to remain competitive in autonomous MaaS. However, EasyMile also provides driverless goods transportation solutions.

Latest news

Volkswagen ADMT announces agreement with Mobileye for autonomous driving.

(20.03.2024)

[Read](#)

Volvo Cars to debut autonomous driving Ride Pilot feature in California.

(06.01.2022)

[Read](#)

HOLON to establish autonomous shuttle manufacturing facility in Jacksonville, Florida, pioneering the future of mobility in the US.

(04.09.2024)

[Update](#)
[Read](#)

MicroSys and EasyMile collaborate on the development of safety-critical technology for autonomous driving.

(02.04.2024)

[Read](#)

L4 target

2026

Not announced

2026

L4 permission on one public road in France.

At a glance

Latest news

L4 target



Navya Mobility's (ex-GAMA) focus is SDS development, vehicle implementation and operation. As the technology is limited to **fixed routes** and **low speed applications**, it will be quite challenging to compete with more mature AV players. Gated areas seem to be the only promising use case in the future.



Oxa is **one of the few remaining autonomous technology provider in Europe**. First roboshuttle deployments in the US have been accomplished. We believe, Oxa fleets will soon at least hit the roads in the UK after the government's Automated Vehicles Act became law by May 2024.



Imagry's technology relies on **multiple 360° cameras** and is based on a **deep neural network** that learns to drive by imitating human behavior. Imagry is quite present on European conferences. Therefore, we are eagerly awaiting first bus deployments in Europe.



MAN has not yet made an appearance in the bus segment in the context of autonomous driving. The **MINGA** project, in which MAN has a **strong partner at its side in SDS provider Mobileye**, is the first step. We see great added value in automated city buses and are excited about the project.

Gaussin-Macnica-Mobility becomes Navya Mobility.
(09.08.2024)

Update

Read

Not announced

StreetDrone now part of Oxa, bolstering Oxa's position in industrial logistics.
(18.09.2024)

Update

Read

Not announced

Imagry unveils safe Driver Overwatch™, an autonomous safety feature for young and elderly drivers, at CES 2024.
(09.01.2024)

Read

Not announced

MAN Truck & Bus to make city buses autonomous with Mobileye.
(17.05.2023)

Read

Not announced

At a glance



The Estonian startup offers autonomous and sustainable last-mile solution and claims to develop the **first autonomous hydrogen vehicle** in the world. Although there are already pilot projects, it will be tough to prevail against the well-known shuttle providers.



Verne creates an AV ecosystem consisting of three pillars: an **autonomous electric vehicle** for ride hailing, specialized **infrastructure**, and a mobility **service platform**. The goal is to reshape future mobility and create a unique user experience. Let's see if they will make it to industrialize their solution.



Avride is the **rebranded, international division** of the robotaxi and delivery robot company **Yandex Self-Driving Group**. While international assets have been separated from Russian-owned Yandex assets, Avride said it's testing AVs in diverse ODDs across the globe, focusing on safety.



Renault teamed up with Waymo on autonomous driving back in 2019 – no further announcements yet. Also, **Renault is partnering with WeRide on self-driving public transit** in France. A first pilot is about to be implemented by 2024.

Latest news

Auve Tech extends reach to U.S. market & enhances strategic partnership with Guident Ltd.

(05.04.2024)

[Read](#)

Verne: Journey to the future of mobility.

(26.06.2024)

[Read](#)

Yandex self-driving group rebrands its international division as Avride.

(04.08.2023)

[Read](#)

Renault Joins Forces with WeRide for Low-Carbon Public Transit Practice in Europe.

(15.05.2024)

[Read](#)

L4 target

Not announced

2026

Not announced

Not announced

At a glance



Schaeffler joined forces with VDL to build shuttles based on its rolling chassis and VDL's expertise in vehicle bodies. The shuttle will be **powered by Mobileye's SDS** while first road tests are to be expected earliest 2025. Now it's essential to bag first partnerships with fleet operators and PTAs.



MOTOR Ai develops a **full-stack software solution for L4, relying on raw sensor data**. The SW stack aims to be **SOTIF compliant and meet AFGBV regulations**. The company also **developed a retrofittable Drive-by-Wire system**. We look forward to seeing the first vehicles on public roads and if the ambitious timeline can be met.

Latest news

Schaeffler and VDL Groep to team up on self-driving shuttles.

(31.08.2023)

[Read](#)

There is currently no broad news coverage or communications initiatives. Please check the LinkedIn channel for recent updates.

[Read](#)

L4 target

Not announced








2025

Privately Owned Vehicles.

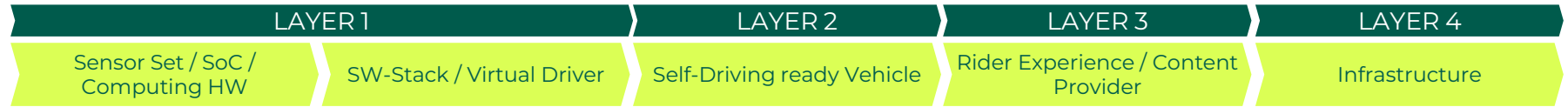
Intro | Use Cases & Layer Description



Privately Owned Vehicles | Use Cases

			 Private Ground	 Highway	 Urban	 Suburban	 Rural
			Airport, factories, yards, harbors, ...	Highways, freeways, ...	City center, designated streets, ...	Federal highway, residential areas, ...	Rural roads, gravel road, ...
POV	Parking		home yard parking (L4)	-	self parking pilot car park (L4), urban self parking (L5)	self parking pilot parking place (L4) [e.g., supermarket], self parking (L4)	
	Driving		-	pilot (L2+), pilot (L3), chauffeur (L4)	urban highway / ring roads pilot (L2+ - L3) , city chauffeur (L4)	commuter pilot (L3/L4) , chauffeur (L4)	

POV | Layer Model Description



Self-Driving System (SDS) is the sum of all necessary systems to realize self driving level 4 (SAE). Key functionalities are sensor data fusion, object detection, localization, prediction, environment interpretation, trajectory planning and actuator control. The HW stack includes sensors, SoC and computing platforms, for example, while the SW stack covers the virtual driver, among others.

Self-Driving Vehicles (SDV) are considered L4 ready vehicles with an integrated and homologated SDS (sensors, computing hardware and software), which operate in a specific ODD (Operational Design Domain).

The **Content Provider** for **Rider Experience** owns a software platform that acts as middleware to service partners. Digital content (e.g., media), digital products (e.g., productivity tools) and digital services are part of this platform.

The service area and its **infrastructure** are core elements to enable an AD service. Infrastructure includes the vehicles' IT infrastructure (especially cloud services and backend), V2X technology and takes into account human behavior prediction in that specific scenery.

POV | Layer Model Description

Exemplary tasks

LAYER 1		LAYER 2	LAYER 3	LAYER 4
Sensor Set / SoC / Computing HW	SW-Stack / Virtual Driver	Self-Driving ready Vehicle	Rider Experience / Content Provider	Infrastructure
HW development	SW development	Design & development	TV & streaming	Localization
HW production	Simulation	Redundant chassis	Shopping	3 rd party HD maps
After sales	Prediction	SDS integration	Education	V2X (e.g., cellular, satellite, WIFI)
Automotive approval	SDS licensing	SDV testing	Working	Cloud infrastructure
Sensor testing & approval	SW testing & approval	After sales	Gaming	Teleoperations
...	HD mapping	Production	...	Human behavior prediction
	Verification & validation	Logistics		Service area
	...	Sales channel		...
		Homologation		
		Pricing		
		...		

Privately Owned Vehicles. **NAR.**

Partnering & Value Chain, Level 4 Target & Latest News





LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience/ Content Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
							 China		
						Not announced			
Core Business		Partnership or supplier deal	Investment	Acquisition	Parent / Subsidiary	Update			



LAYER 1		LAYER 2		LAYER 3		LAYER 4				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience/ Content Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement		3 rd party HD Maps	Cloud	V2X & Others
<div><div>mobileye</div><div>Valeo</div></div>	<div><div>mobileye</div><div>地平线</div></div>	<div>mobileye</div>	<div>ecarX</div>	<div><div>Ford</div><div>GWM</div><div>HONDA</div><div>BMW</div><div>PORSCHE</div><div>XPENG</div><div>ZEKER</div><div>INTEL</div><div>gm</div><div>Mahindra</div><div>Volkswagen</div></div>		Not announced		<div>Volkswagen Group</div>		
<div>Ouster</div>	<div>NVIDIA</div>		<div>helm.ai</div>	<div>HONDA</div>		Not announced		Not announced		
<div>Continental</div> <div>BOSCH</div>	<div>NVIDIA</div>	<div>Lucid</div>		<div>Lucid</div>		Not announced		Not announced		

Core Business

Partnership or supplier deal

Investment

Acquisition

Parent / Subsidiary

Update



At a glance



Tesla **collects a huge amount of data** and build a unique ecosystem around the fleet. While there are still legitimate discussions about the robustness of vision-only approaches, the **performance of FSD in the US is already impressive**. Nevertheless, it is still an L2+ system.



GM has **combined its former Ultra Cruise system** (former goal to achieve hands-free driving for 95 percent of scenarios) **with its Super Cruise program**. May there also be a chance for struggling GM-backed Cruise to power GM vehicles? Also, in **China, GM has invested in Momenta**.



After getting off the robotaxi business with Argo.AI, Ford said **to focus on developing differentiated L2+ and L3 applications** for privately used cars. By 2023, Ford established Latitude to develop future automated driving technology.



Mobileye is the **leading supplier for camera-based driver assistance systems**. In addition to L4 technology for robotaxis, **SuperVision is its state-of-the-art L2+ (eyes on) system**. Also, first **OEMs teamed up with Mobileye to integrate its Chauffeur (eyes off) solution**. We are very much looking forward to testing it on European roads.

Latest news

Elon Musk confirms Tesla 'robotaxi' event delayed due to design change.

(15.07.2024)

[Read](#)

GM's hands-free Super Cruise expands to 750,000 miles.

(14.02.2024)

[Read](#)

Ford BlueCruise hands-free driving technology approved for customers to use across the highways of Europe.

(31.07.2024)

[Update](#)
[Read](#)

Mobileye to end internal Lidar development.

(09.09.2024)

[Update](#)
[Read](#)

L4 target

No binding roadmap for FSD

2025

Not announced

Not announced



At a glance

helm.ai



Helm.ai employs an AI-first approach to building AD software using an **unsupervised learning technology** which leverages insights from applied mathematics and compressive sensing. This technology allows to **train on vast volumes of data** without the need for large scale fleets or human annotation.

lucid



Lucid's advanced luxury EVs are about to be equipped with its **DreamDrive ADAS systems**, consisting of **up to 32 sensors** and offering **more than 30 driver-assistance features**. Since hardly anything is known about partnerships, the **SW is apparently primarily developed in-house**.

Latest news

Helm.ai unveils new AI simulation tool for Autonomous Driving.

(01.08.2024)

[Update](#)[Read](#)

Driving on Air: Lucid Group builds intelligent EVs on NVIDIA DRIVE.

(22.03.2022)

[Read](#)

L4 target



























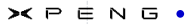









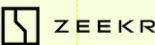


Not announced























































Not announced











Privately Owned Vehicles. Asia.

Partnering & Value Chain, Level 4 Target & Latest News



LAYER 1		LAYER 2		LAYER 3		LAYER 4				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience/ Content Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement		3 rd party HD Maps	Cloud	V2X & Others
   	   			  		 		 		
    	    					 Not announced		 		
	 	 		 		 Not announced				

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience / Content Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
     	      	    				Not announced			
  	    	    				Not announced			 
    	  	   				Not announced	 		
Core Business		Partnership or supplier deal	Investment	Acquisition	Parent / Subsidiary	Update			

























LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience/ Content Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
    	 SemiDrive    	 				Not announced	 		
	 					Not announced			 
  	  	 				Not announced			








































LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience / Content Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
HESAI HUAWEI SenseAuto	HUAWEI Horizon Robotics NVIDIA SenseAuto WNDVR	MINIEYE SenseAuto	BlackBerry HUAWEI	NETA HORIZON AS&C		Not announced		HUAWEI	HUAWEI
GEE GROUP HESAI ZongMu OFILM 欧菲光 舜宇智能光学	地平线智能 NVIDIA	MI GEE GROUP DeepTation ZongMu		千麟科技 MI		Not announced	ZongMu Baidu		
HESAI	NVIDIA	nuli max	BlackBerry	华人道通 HiPhi		Not announced		HUAWEI	华人道通









































LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience/ Content Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
robosense 	 	 		 		Not announced			
robosense 	 	 		 		Not announced		 	

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience / Content Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
 				 					
				 		Not announced			
  						Not announced			



LAYER 1		LAYER 2		LAYER 3		LAYER 4				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience/ Content Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement		3 rd party HD Maps	Cloud	V2X & Others
				      	 	Not announced				
	     			     		Not announced				
  	 		 		Not announced					



LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience/ Content Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
<div>  </div>	<div>  </div>	<div>  </div>		<div></div>		<div></div>	<div>  </div>		
<div></div>	<div> </div>	<div></div>		<div></div>	<div></div>	<div>Not announced</div>	<div></div>		
<div>  </div>	<div>   </div>	<div></div>		<div>       </div>		<div>Not announced</div>	<div> </div>	<div></div>	<div></div>
Core Business Partnership or supplier deal Investment Acquisition Parent / Subsidiary Update									

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience/ Content Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
<div>robosense</div> <div>Ambarella</div>		LOTUS ROBOTICS		<div>LOTUS</div> <div>GEELY</div> <div>LINK&CO</div>		Not announced		LOTUS ROBOTICS	



At a glance

NIO



While NIO premium EVs are **hitting several markets outside China**, ADAS capabilities and functions of other competitors in China seem to be slightly more advanced and widely available.

XPENG



XPENG announced that its XNGP urban intelligent driving system has achieved **100% HD map-free operation** with the goal to achieve full coverage of XNGP functions in major urban road networks across China by the end of 2024.

ZEEKR



Geely's EV brand **develops the SPV robotaxi for Waymo** while **incorporating Mobileye's SuperVision system for private owned cars**. Considering prices, technological specifications and functions, Zeekr vehicles can also be a real alternative to conventional manufacturers in Europe.

BYD



In December 2021, **BYD and Momena**, one of China's major SDS developers, formed a **joint venture for autonomous driving**. To date, ADAS functionalities and availability lag behind other competitors in China.

Latest news

NIO said to revamp intelligent driving R&D division, focusing on end-to-end large models.

(20.06.2024)

[Read](#)

XPENG completes tape-out of self-developed TURING chip.

(28.08.2024)

[Update](#)
[Read](#)

ZEEKR, Mobileye to speed up technology cooperation in China.

(02.08.2024)

[Update](#)
[Read](#)

BYD FANGCHENGBAO's vehicles to adopt Huawei's smart driving tech.

(27.08.2024)

[Update](#)
[Read](#)

L4 target

Not announced

Not announced

Not announced

Not announced



At a glance



GWM aims to provide complete mobility ecosystems with dedicated brands for the European markets. **Regarding AD**, GWM has been working with companies such as **Mobileye, Qualcomm** or **Nullmax**. GWM is pursuing a strong partnership approach.



While BAIC teamed up with Baidu to develop robotaxis, its EV brand **Arcfox models are equipped with Huawei software and sensor suite**. Our regular ADAS benchmark drives in China showed: **Huawei system's performance is stunning**.



China's largest carmaker intends to equip premium electric vehicle models with **Momenta-developed intelligent driving technology**. SAIC may not seem as 'fancy' in its outward appearance as some startups from China – that's why they co-founded IM Motors in a JV with Alibaba.



IM Motors, **co-founded by SAIC Motor, Zhangjiang Hi-Tech, and Alibaba** pushes its AD capabilities through **joint development with Momenta**. While urban NOA was implemented swiftly, IM also obtained the official AV testing license for highway/expressway in Shanghai for L3 testing.

Latest news

NavInfo nominated to supply Great Wall Motor with smart driving products.

(13.09.2024)

[Update](#)
[Read](#)

ARCFOX granted L3 highway autonomous driving vehicle testing license in Beijing.

(22.12.2023)

[Read](#)

SAIC Motor, ZTE co-launch vehicle communication module platform.

(21.08.2024)

[Update](#)
[Read](#)

IM Motors kicks off presale of IM L6 model with price range of 230,000 to 330,000 yuan.

(09.04.2024)

[Read](#)

L4 target

Not announced

Not announced

Not announced

Not announced



At a glance

Latest news

L4 target

Li Auto



Li Auto is another EV company aiming for autonomous driving. While Li **claims** their **technology will soon be competitive with Tesla's Autopilot**, they have **yet to prove those capabilities**. Competition in China is strong.

Li Auto unveils new intelligent driving system updates at Chengdu Motor Show 2024.

(30.08.2024)

[Update](#)
[Read](#)

Not announced

NETA



NETA Auto, a Hozon Auto brand, is one of several Chinese OEMs that has entered into **in-depth cooperation with Huawei**. Furthermore, teaming of with Hesai for future vehicle models shall further enhance automated driving capabilities.

Wind River powers NETA Auto's intelligent controller.

(19.07.2024)

[Read](#)

Not announced

mi



Xiaomi sets sight on several autonomous electric vehicle brands by **substantially investing in smart car technology**. The unveiled **Xiaomi SU7 offers great user experience at lower cost** than Western OEMs – the ADAS has still some weaknesses but is about to catch up with competition.

Xiaomi SU7 to roll out urban NOA feature in ten cities.

(31.05.2024)

[Read](#)

Not announced

HiPhi



HiPhi, a **brand of Human Horizons** is developing the **'HiPhi Pilot'**, providing redundant and safe intelligent driving features aiming at both L3 and L4. At this point, too little is known about the AD capabilities to seriously assess the company. **Meanwhile, the company seems to face bankruptcy**.

Human Horizons, Huawei Cloud partner on dedicated intelligent driving cloud.

(25.07.2023)

[Read](#)

Not announced



At a glance



FAW Group established several **partnerships along the AD ecosystem – tech providers such as DJI or Mobileye** are about to integrate their smart driving solutions into FAW Group's vehicles, usually starting with FAW's Hongqi brand.



Through **various partnerships**, the company is driving the development of intelligent vehicles. **Chery plans to offer L4-capable vehicles in 2025.** Not much time left. Partnerships with iMotion, Nullmax or dji could boost the development.



GAC is the fifth largest car manufacturer in China and sells its vehicles under various brands. The company has always **worked closely with Huawei** and plans to produce L4 vehicles under its own AION brand from 2024 as a manufacturing partner of Huawei.



CHANGAN is **working closely with Huawei on Level 4 Autopilot**, 5G, and C-V2X, and plans to offer **L4 capabilities in 2025**. Recently, the company announced a strategic cooperation with Geely, among others, to combine strengths and share resources in the development of autonomous cars.

Latest news

FAW Group partners with DJI Automotive for intelligent driving tech development.

(19.04.2024)

[Read](#)

Horizon Robotics, Chery advance collaboration on Journey 6 smart computing platform.

(20.09.2024)

[Update](#)
[Read](#)

GAC Toyota, Momenta to debut end-to-end smart driving solution on bZ3X model.

(01.07.2024)

[Read](#)

Bosch delivers 3rd-gen multipurpose camera to Changan DEEPAL G318.

(28.05.2024)

[Read](#)

L4 target

Beyond **2025**

2025

Not announced

2025



At a glance



Dongfeng's **VOYAH brand vehicles** are about to be equipped with **Baidu's intelligent driving system**, offering features like Navigation on Autopilot, intelligent cruise control, automatic lane changes as well as various parking modes.



JI YUE is a joint venture between Geely and Baidu. The first production model relies on solely visual perception algorithms and thus a **pure vision approach**. The company intends to cover 200 cities nationwide with its advanced urban intelligent driving functions by end of 2024.



During our benchmark drives in China, **Huawei's ADS 2.0 performance was stunning**. ADS 3.0 is about to be unveiled by the end of 2024 and promises another leap in performance. Also, the solution has been integrated in different EV models. Huawei had the goal to become China's Bosch – towards **SW capabilities, it's already much more advanced in China**.



Nullmax pursues a '**Machine Learning First**' approach and has **teamed up with several OEMs, chip suppliers and other companies**. While the depth of cooperation is often unclear, you should keep an eye on Nullmax and its **vision-based, multi-sensor fusion and perception technology** route.

Latest news

Dongfeng Motor, Huawei inaugurate joint intelligent vehicle control center.

(25.09.2024)

[Update](#)
[Read](#)

JI YUE 07 commences pre-sales at 215,900 yuan, featuring Baidu's Apollo Self Driving tech.

(29.08.2024)

[Read](#)

AITO rolls out HD map-free NCA smart driving function nationwide.

(20.03.2024)

[Read](#)

Nullmax launches pure-vision multimodal autonomous driving tech 'Nullmax Intelligence'.

(17.06.2024)

[Read](#)

L4 target

Not announced

Not announced

2025

Not announced



At a glance



QCraft holds a **permit to test robobuses** in Beijing and has been operating a small robotaxi fleet.. However, the company is meanwhile focusing on advanced L2+ than L4 robotaxis and teamed up with Li Auto, for instance.



While providing its own "SENSING" ADAS, Honda has attracted attention primarily through **investing in GM's Cruise for MaaS initiatives**. An **investment in Helm.ai**, however, is intended to benefit the company's own software and AI competencies.



Haomo.ai is **backed by GWM** and develops its urban navigation-assisted H-pilot for mass-production. By Feb 2024, it has been **integrated in over 20 vehicle models**, achieving >120 mn km of assisted driving. Gathering a huge amount of data may be beneficial towards L4 development.



Momenta **attracted attention** primarily due to **investments and partnerships** (e.g., from Toyota, Mercedes-Benz, and Bosch). Although Momenta operates a small robotaxi fleet in China, the **focus is on advanced L2+ solutions for OEMs** in all key markets.

Latest news

NavInfo, QCraft deepen partnership in intelligent driving field.

(14.09.2024)

[Read](#)

Honda unveils SENSING 360+ system.

(28.11.2023)

[Read](#)

Haomo.ai nabs 300 million yuan in Series B2 financing round.

(23.04.2024)

[Update](#)
[Read](#)

GAC Toyota, Momenta to debut end-to-end smart driving solution on bZ3X model.

(01.07.2024)

[Read](#)

L4 target

Not announced

2025

Not announced

Not announced

At a glance



Lotus Robotics, the intelligent driving arm of Lotus Technology, provides comprehensive intelligent driving solutions, including advanced platform software, cloud toolchains, and operation solutions. While the company may be relatively unknown in Europe and the USA, its **AD capabilities are seen by local experts as among the best in the Asian market.**

Latest news

Lotus deploys Ambarella's Oculii™ AI 4D Imaging Radar technology in L2+ semi-autonomous systems for Eletre SUV and Emeya Hyper-GT Electric vehicles.

(24.09.2024)

[Read](#)

L4 target

Not announced

Privately Owned Vehicles. Europe.

Partnering & Value Chain, Level 4 Target & Latest News





LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience/ Content Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
LUMINAR BOSCH Valeo veoneer	NVIDIA brainchip Qualcomm	NVIDIA Baidu Momenta				Mercedes me ZYNC	DEEPMAP here	Tencent 腾讯	
INNOVIZ TECHNOLOGIES APTIV MAGNA veoneer Valeo	mobileye Qualcomm	Ariiver Valeo AutoBrains Tencent 腾讯 STELLANTIS TATA TECHNOLOGIES	TTTech BlackBerry		Continental S	BMW CONNECTED DRIVE AirConsole	here aws	ottopia	
mobileye INNOVIZ TECHNOLOGIES	NVIDIA Qualcomm CARIAD mobileye	VAIA Safe Mobility Hendrick Automotive UAD INTENTA Horizon Robotics BOSCH	CARIAD BlackBerry Luxoft TTTech Applied Intuition	VOLKSWAGEN GROUP		Not announced	tomtom mobileye here 高德 NIRA	Microsoft verizon HUAWEI	



LAYER 1		LAYER 2		LAYER 3		LAYER 4				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience/ Content Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement		3 rd party HD Maps	Cloud	V2X & Others
 	 	 				Not announced		 		
 		 	 	 		Not announced				
 	 	 		 		Not announced		 		
Core Business		Partnership or supplier deal		Investment		Acquisition		Parent / Subsidiary		Update



LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Rider Experience/ Content Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Entertainment & advertisement	3 rd party HD Maps	Cloud	V2X & Others
BOSCH Webasto	RECOGNI NVIDIA QVCC Ambarella BOSCH	UAD momenta FIVE AI RECOGNI CARIAD Microsoft			BOSCH next	Not announced	tomtom DEEPMAP here atlatelc	Microsoft	
LUMINAR	in mobileye NVIDIA	in mobileye		polestar		polestar Google	Google		
	NVIDIA		WAYVE	JAGUAR Uber <p>The two companies collaborate with OEMs to use Wayve's AI. Long-term target to integrate Wayve-powered AVs on the Uber network.</p>		Not announced		Microsoft	



At a glance



Drive Pilot is the world's first ADAS to gain type approval for a L3 system and available in Europe and the US. Initially, the supported speed was limited to 60 km/h. In 2024, an upgrade was announced, enabling the system to follow a vehicle on the motorway at up to 95 km/h.



BMW seems to have greatly **reduced its own activities with regard to L3 and L4** and **instead focuses on partnerships** - most recently with Stellantis and Tata. In our regular ADAS benchmark drives, BMW's driver assistance systems show the strongest performance among all European OEMs.



CARIAD is primarily responsible for software development in the **private ownership** segment. There is also a development partnership (Automated Driving Alliance) with Bosch. We are watching the development of CARIAD and are curious to see whether they can live up to their great task.



Stellantis is working on **L3 and L4 solutions with technology partners** - especially **BMW and Waymo**. In 2023, Stellantis launched its L2 hands-free driver assistance system, which will be integrated into the 2024 Jeep Grand Cherokee.

Latest news

Support speed of up to 95 km/h on German motorways..

(23.09.2024)

[Update](#)
[Read](#)

BMW Group and Tata Technologies aim to collaborate for the development of Automotive Software and Business IT solutions.

(02.04.2024)

[Read](#)

Volkswagen Group intensifies collaboration with Mobileye.

(20.03.2024)

[Read](#)

Stellantis boosts LiDAR technology.

(20.03.2024)

[Read](#)

L4 target

Not announced

Not announced

Not announced

Not announced



At a glance

• APTIV •



Aptiv is a leading company in the development of ADAS for and invested a huge amount of money in Motional, a JV with Hyundai, before reducing its common equity interest from 50% to about 15% by end of March 2024.

Aptiv has acquired or at least invested in software companies to strengthen in-house capabilities towards ADAS and AD.

Continental



Continental **spun off its own AD unit**. Traditional Tier 1 such as Conti compete with strong SW players as OEMs/ customers increasingly purchase HW and SW separately. However, partnerships and investments in AI companies show that Conti **is willing to keep up the race**.

BOSCH



Bosch **teamed up with CARIAD** to jointly develop automated driving functions and acquired AV company Five AI a couple of years ago to strengthen its AD capabilities. Traditional Tier 1 such as Bosch **compete with strong SW players** as OEMs/ customers increasingly purchase HW and SW separately

polestar



Polestar is a renowned EV player in the EU market. While ADAS of both Polestar 1 and 2 can't compete with many competitors, there is supposed to be a **significant leap with Polestar 3 and 4**. With **NVIDIA, Luminar and especially Mobileye**, they have strong technology partners at their side.

Latest news

Horizon Robotics, Aptiv join forces to develop localized intelligent driving solutions.

(03.07.2023)

[Read](#)

Continental technical collaboration with Qualcomm.

(13.05.2024)

[Read](#)

For safer roads: Bosch teams up with Microsoft to explore new frontiers with generative AI.

(28.02.2024)

[Read](#)

Polestar 4 to integrate Luminar LiDAR with Mobileye Chauffeur.

(09.11.2023)

[Read](#)

L4 target

Not announced

Not announced

Not announced

Not announced

At a glance



Wayve does **not rely on HD maps** and **hand-coded rules** but **focuses on its deep and self-learning AI technology** based on cameras. The company raised \$1bn in 2024 to take its Tesla-like technology for self-driving to many carmakers. This approach is different compared to Tesla.

Latest news

UK's Wayve secures strategic investment from Uber to further develop self-driving tech.

(29.08.2024)

Update

Read

L4 target











Not announced

Goods Transport & TaaS.

Intro | Use Cases, Market Insights & Layer Description



Goods Transport & TaaS | Use Cases

							
			Gated Area	Highway	Urban	Suburban	Rural
			Airport, factories, yards, harbors, ...	Highways, freeways, ...	City center, designated streets, ...	Federal highway, residential areas, ...	Rural roads, gravel road, ...
Transport	S		last mile delivery	-	last mile delivery	last mile delivery	last mile delivery
	ML		automated yards, e.g., intralogistics trucks (L4)	-	hub-and-spoke robo transporter	hub-and-spoke robo transporter	robo transporter
	XL		automated yards, e.g., intralogistics trucks (L4)	hub-to-hub self-driving truck	-	-	-
Platooning			automated yards, e.g., intralogistics trucks (L4)	hub-to-hub self-driving truck	-	-	-
Offroad			e. g. snow clearing (L4), rob harvesters	-	e. g., street sweeping machines (L4)	e. g., street sweeping machines (L4)	e.g., robo tractor

Automated Yards



Transportation within gated areas, yards, hub or similar confined areas

Hub-to-Hub



Hub-to-hub transportation between logistic hubs incl. drayage run

Hub-and-Spoke

















Hub-and-spoke transportation from a hub to different spokes incl. drayage runs

Robo Transporter



Robotransporter
Free float autonomous transport vehicles & other use cases such as shuttles

Goods Transport & TaaS | Longlist

											
											
Transport	S										
	ML	P 				P 				G/P 	
	XL	P 	P 	P 	P 	P 	P 	P 	P 		P 
Platooning					P 			P 	P 		P 
Offroad					P 				G/P 		G 

 Activities
  No activities
  Stopped activities
  G=Gated Area
  P=Public Area

Goods Transport & TaaS | Longlist

Transport	S				P 			P 			
	ML	P 		P 		P 		P 			
	XL		P 		P 	P 	P 	P 	P 	P 	P
Platooning						P 	P 	P 			
Offroad											

Goods Transport & TaaS | Longlist

		STARSHIP	AVRIDE	TORC	MARS	SAIC	NEOLIX	HYUNDAI MOTOR GROUP	DAF	CRUISE	阿里巴巴 Alibaba.com
Transport	S	G/P 	P 					P 			
	ML						P 			P 	G/P
	XL			P 	P 	G/P 					P Da Man Lv - No picture available yet
Platooning								P 	P 		
Offroad											

Goods Transport & TaaS | Longlist

Transport	S								P 		P
	ML		P 	P 			P 	P 		P 	
	XL	G 			G 	P 					
Platooning											
Offroad			G/P 				P 				

Goods Transport & TaaS | Longlist

Transport	S		P 	P 			P 				
	ML				P 	P 		P 			
	XL								P 	P 	P
Platooning											
Offroad		P 									

Goods Transport & TaaS | Longlist

			CLEVON	driveblocks		LOXO	Goggo network		tinymile		NEUBILITY
Transport	S	P 	P 						P 	P 	P
	ML					P 	P 				
	XL			P 	P 			P 			
Platooning											
Offroad				G 							

Goods Transport & TaaS | Longlist

Transport	S						
	ML		P 	P 	P 		
	XL	P 				P 	P
Platooning							
Offroad							

Goods Transport & TaaS | Layer Model Description



Self-Driving System (SDS) is the sum of all necessary systems to realize self driving level 4 (SAE).

Key functionalities are sensor data fusion, object detection, localization, prediction, environment interpretation, trajectory planning and actuator control.

The HW stack includes sensors, SoC and computing platforms, for example, while the SW stack covers the virtual driver, among others.

Self-Driving Vehicles (SDV) are considered L4 ready vehicles with an integrated and homologated SDS (sensors, computing hardware and software), which operate in a specific ODD (Operational Design Domain).

Fleet Operators potentially own, operate and maintain a fleet of self-driving vehicles. It may be necessary that a fleet operator is responsible for fleet intelligence functions and technical supervision or **remote assistance**. In case of TaaS the fleet operator may also be responsible for **hub operations**. Therefore, Layer 3 covers both physical and digital fleet operations.

Transport providers (i.e., carriers) carry goods from shippers (e.g., grocery stores) to B2B or B2C customers using autonomous vehicles. Freight matching may be executed by **Platform providers** that connect shippers and carriers or transport demand and supply. They are responsible for order management or disposition planning based on data analysis and simulation.

The service area and its **infrastructure** are core elements to enable an AD service. Infrastructure includes the vehicles' IT infrastructure (especially cloud services and backend), V2X technology and considers human behavior prediction in that specific scenery.

Goods Transport & TaaS | Layer Model Description

Exemplary tasks




















































LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5
Sensor Set / SoC / Computing HW	SW-Stack / Virtual Driver	Self-Driving ready Vehicle	Fleet, Hub & Tele Operations	Transport & Platform Provider
HW development	SW development	Design & development	Fleet financing	Logistics platform
HW production	Simulation	Redundant chassis	Insurance	Interface connection
After sales	Prediction	SDS integration	Fleet depot	Disposition planning
Automotive approval	SDS licensing	SDV testing	Cleaning	Fleet Intelligence (e.g., fleet & ride optimization)
Sensor testing & approval	SW testing & approval	After sales	Maintenance	Order management
...	HD Mapping	Production	Backend (Layer 1-4)	Booking
	Verification & validation	Logistics	Concessions	Routing
	...	Sales channel	Fleet Control Center	Pricing
		Homologation	Teleoperations	Payment
		Pricing	Hub Operations	Customer service
		...	Driver sideline activities	Authentication (delivery services)
				...

Goods Transport & TaaS. NAR.

Partnering & Value Chain, Level 4 Target & Latest News






























































Goods Transport & TaaS NAR



















































LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport		3 rd party HD Maps	Cloud	V2X & Others
 WAYMO	 	 WAYMO	 LATENT LOGIC	 JAGUAR	Note: trucking will not be considered here anymore	 AutoNation	 WAYMO	 Uber Freight	Not announced			
 LUMINAR	 Aeva	 TORC	 TNO Innovation for life  Applied Intuition  ForetelliX  DeepScenario	 FREIGHTLINER		 PENSKE		 SCHNEIDER  C.R. England  Uber Freight	 aws			
 Plus	 NVIDIA	 Plus	 BlackBerry	 PACCAR  TRATON  IVECO  SAIC  FAW  JAC  HYUNDAI	 VELOCITI  SCHAEFFLER  BOSCH	 GOODYEAR		 amazon  SF EXPRESS  ZTO  DSV  dm  Kuehne+Nagel  WORLDDEX	 ZTO  DSV  dm	 aws  Alibaba.com 	 Transurban	
Core Business	Partnership or supplier deal	Investment	Acquisition	Parent / Subsidiary	Update							

Core Business Partnership or supplier deal Investment Acquisition Parent / Subsidiary Update



Goods Transport & TaaS NAR

LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport		3 rd party HD Maps	Cloud	V2X & Others
<div></div> <div></div> <div></div>	<div></div> <div></div>	<div></div>	<div></div>	<div></div> <div></div>	<div></div> <div></div>	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div>		<div></div> <div></div> <div></div> <div></div> <div></div> <div></div>	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div>	Not announced		<div></div>
	<div></div>	<div></div>		<div></div> <div></div> <div></div> <div></div>		Not announced		Uber Freight		Not announced		
<div></div> <div></div> <div></div> <div></div>	<div></div> <div></div>	<div></div> <div></div>		<div></div> <div></div>	<div></div>	<div></div>	<div></div>	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div>	<div></div>	<div></div>	<div></div>	
Core Business	Partnership or supplier deal	Investment	Acquisition	Parent / Subsidiary	Update							

















Goods Transport & TaaS NAR

LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport		3 rd party HD Maps	Cloud	V2X & Others
				 	 	  		    pitney bowes  	  	Not announced		
  	 	  	  				    Uber 	  				
 		 				Not announced		   		Not announced		
Core Business	Partnership or supplier deal	Investment	Acquisition	Parent / Subsidiary	Update							

Goods Transport & TaaS NAR

LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport		3 rd party HD Maps	Cloud	V2X & Others
 				  				    				
Not announced		 		  		Not announced						
 						Not announced		Not announced				
Core Business		Partnership or supplier deal		Investment		Acquisition		Parent / Subsidiary		Update		

Goods Transport & TaaS NAR

LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport		3 rd party HD Maps	Cloud	V2X & Others
<div><div> Whale dynamic</div><div>Whale Dynamic AV stack consists of 3rd party HW</div></div>		<div><div> Whale dynamic</div></div>		<div><div> OX</div></div>			<div><div> zeeba</div></div>	<div><div> robomart</div><div> AVERY DENNISON</div></div>		Not announced		
Not announced		<div><div> KODAK</div><div> TORC</div><div> Gatik</div><div> driveblocks</div><div> EMBARK</div><div> Applied Intuition</div></div>		<div><div> ISUZU</div><div> DAIMLER TRUCK</div><div> TRATON</div><div> einride</div></div>		Not announced		Not announced	Not announced			

NEW

Goods Transport & TaaS NAR

At a glance



The Waymo Driver has **over a decade of deep AD experience** including **millions of miles on public roads** and **billions of miles in simulation**. Waymo has **reduced trucking efforts to a minimum** in order to focus on the ride hailing case. Also, the existing fleet is used for food delivery via Uber Eats,



Torc is an independent **subsidiary of Daimler Truck AG** and the **first AV company to enter an integrated partnership** with a **truck OEM**. Torc and DT are ramping up development and testing in the US. Go-to-market is targeted for 2027.



PlusDrive follows an **evolutionary path from L2++ to L4**. **Global initiatives in cooperation with IVECO, TRATON Group, and Hyundai have been announced**. In contrast to competitors, Plus is already testing its self-driving and highly automated trucks on European roads.



Kodiak Robotics develops autonomous technology for long-haul trucking and carried the **first commercial freight just eight months after being founded**. After long considering Kodiak as an acquisition candidate, they meanwhile became **one of the strongest players in the market**.

Latest news

Phoenix residents can now experience Uber Eats delivery with the Waymo Driver.

(03.04.2024)

[Read](#)

Daimler Truck and TORC Robotics select Aeva to supply advanced 4D LiDAR technology for series-production autonomous trucks.

(09.01.2024)

[Read](#)

Alibaba Cloud teams with Plus to build cloud-based autonomous driving solution.

(23.09.2024)

[Update](#)
[Read](#)

Kodiak selects Wabash's Trailers as a Service to optimize its autonomous fleet.

(23.09.2024)

[Update](#)
[Read](#)

L4 target

Focus on ride hailing and urban delivery with I-PACE fleet

2027

Not announced

2025

Goods Transport & TaaS NAR

At a glance



Toronto-based Waabi is renowned for both its founder and its **closed-loop simulator**, Waabi World, which targets an **AI-first approach**. Waabi has entered promising partnerships with Volvo and Uber Freight. The company is worth observing.



Instead of deploying robotaxis, Aurora is **focusing primarily on TaaS** and has already entered into truck **collaborations with PACCAR, Volvo and Continental**. These **collaborations promise to scale their test fleet** to get their product ready for production.



Gatik focuses on **short-haul, B2B logistics** for the **retail industry**. More specifically, hub-and-spoke supply chain operations. The vehicles are restricted to **fixed, repeatable routes**. Gatik has found a niche that no other market player is dedicated to now.



Nuro **has been a pioneer in last-mile deliveries** with a special purpose vehicle. In September 2024, Nuro announced to **start licensing its L4 technology** to manufacturers of personally owned vehicles and mobility providers, like ride-hail and delivery companies. A smart move to monetize its tech end create a viable business case.

Latest news

Waabi raises \$200M USD to launch fully driverless trucks in 2025.

(18.06.2024)

[Read](#)

Self-driving truck startup Aurora Innovation raises \$483M in share sale ahead of commercial launch.

(02.08.2024)

[Update](#)
[Read](#)

Gatik secures strategic investment from NIPPON EXPRESS HOLDINGS to expand North American middle-mile logistics.

(21.08.2024)

[Update](#)
[Read](#)

Nuro pivots to license self-driving tech to carmakers, mobility companies.

(11.09.2024)

[Update](#)
[Read](#)

L4 target

2025

2027

L4 target reached in Arkansas by 2021

Not announced

Goods Transport & TaaS NAR

At a glance



After Argo's shutdown, it's unclear how Ford will proceed for urban delivery and trucking. Nevertheless, **Ford Otosan is cooperating with AVL** in this area. We believe they can't keep up with the leading self-driving truck companies.



Udelv has been doing **commercial deliveries for Walmart** for some time. With the 'Transporter' they now have their own **versatile special purpose vehicle**, equipped with Mobileye's promising SDS. It's been quite around Udelv for a while – as other companies, Udelv seem to struggle towards industrialization of its vehicle.



Amazon has **invested in Aurora and conducted road tests with Embark, which later didn't survive market consolidation**. Amazon's vision could be to cover the entire logistics chain - in the future also with autonomous trucks, delivery vehicles and last mile delivery solutions.



Little is still known about Tesla's Semi Truck and targeted automated driving capabilities. According to the company, it will be the first vehicle to drive fully autonomously. The truck is to be equipped with **'enhanced' autopilot functionalities for automated highway driving**. At least we still have doubts.

Latest news

Ford, VW-backed Argo AI is shutting down.

(26.10.2022)

[Read](#)

Ziegler orders autonomous and electric delivery vehicles from the company Udelv.

(05.01.2022)

[Read](#)

Amazon stops field tests of its delivery robot Scout.

(07.10.2022)

[Read](#)

Apple chip maker TSMC to manufacture Tesla's new FSD hardware.

(23.11.2022)

[Read](#)

L4 target

Not announced

Not announced

Not announced

Not announced

Goods Transport & TaaS NAR

At a glance



Robomart has teamed up with a couple of companies to establish the **Autonomous Retail Collective (ARC)**, an ecosystem aimed at developing and advancing self-driving shops. Collaboration is key in the autonomous mobility space – therefore, Robomart is worth to 'watch-out'.



Applied Intuition provides various solutions for its customers, including an ADAS and AD development platform, a vehicle software platform, and an **autonomy stack aimed at off-highway autonomy and trucking**. In 2023, the company **acquired Embark's trucking assets**, which may serve as the basis for their autonomy stack.

Latest news

Robomart unveils autonomous retail collective to propel self-driving shops.

(08.04.2024)

[Read](#)

Applied Intuition and Isuzu Motors Ltd. enter strategic partnership to develop autonomous commercial trucks.

(26.08.2024)

[Read](#)

L4 target

Not announced

Not announced

Goods Transport & TaaS. Asia.

















































Partnering & Value Chain, Level 4 Target & Latest News
































Goods Transport & TaaS ASIA

LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport		3 rd party HD Maps	Cloud	V2X & Others
<div>   </div>	<div></div>	<div></div>		<div> </div>	<div></div>	<div></div>		<div> </div>	Not announced			
<div></div>	<div></div>			<div></div>	Not announced			<div></div>				<div>Tencent 腾讯</div>
<div>  </div>	<div></div>	<div></div>		<div>  </div>			<div></div>	<div>   </div>	<div></div>	Not announced		
Core Business	Partnership or supplier deal	Investment	Acquisition	Parent / Subsidiary	Update							















Goods Transport & TaaS ASIA

LAYER 1				LAYER 2		LAYER 3		LAYER 4	LAYER 5		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport	3 rd party HD Maps	Cloud	V2X & Others
  	 			  		Not announced		       	       		
		 				Not announced		Not announced	Not announced		
 	 	 				Not announced		    	  	 	

Goods Transport & TaaS ASIA

LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport		3 rd party HD Maps	Cloud	V2X & Others
<div>     </div>	<div></div>	<div></div>		<div></div>		Not announced		<div> </div>	<div> SD maps – probably consumer vehicles only</div>			
<div>  </div>	<div></div>	<div></div>		<div></div>		Not announced		<div><div>Hengtongyuan Group</div></div>		Not announced		
Not announced		<div></div>		<div></div>		Not announced		<div> </div>				
<div><div>Core Business</div><div> Partnership or supplier deal</div><div> Investment</div><div> Acquisition</div><div> Parent / Subsidiary</div><div> Update</div></div>												

Goods Transport & TaaS ASIA

LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport		3rd party HD Maps	Cloud	V2X & Others
<div></div>	<div></div>	<div></div>	<div></div>	<div></div>		Not announced		Not announced		<div></div>		
<div></div>	<div></div>	<div></div> <div>TIER IV</div>	<div></div>		Not announced		Not announced		Not announced			

Goods Transport & TaaS

At a glance



Pony.ai is a leading player in L2+ solutions for OEMs as well as L4 robotaxi deployments. However, Pony **will jointly develop premium autonomous heavy-duty truck with SANY and Sinotrans**. They are among the pioneers in the Chinese self-driving truck market.



WeRide, initially focusing on robotaxi business, unveiled **China's very first L4 self-driving cargo van** in September 2021. While WeRide is a leader in China in terms of robotaxis, we are curious to see if they will take this position in the logistics space as well. The company also has a robosweeper in its portfolio.



Investments from Bosch, Nio and BAIC made Trunk.Tech known outside China. It is without question **one of the most promising startups** in the Chinese self-driving truck / freight haulage space.



Chinese startup with the **aim to build a nation-wide freight network** using autonomous trucks. Unlike other AV truck companies, **Inceptio initially focuses on L3**. However, Inceptio could possibly be a hidden champion among autonomous trucks with regard to full autonomy - at least in China.

Latest news

Pony.ai allowed to test Robotaxi, autonomous truck on Guangzhou's expressways.

(21.05.2024)

[Read](#)

WeRide's Robovan permitted to conduct unmanned open-road test in Guangzhou.

(24.05.2024)

[Read](#)

Autonomous truck solution developer Trunk.Tech bags hundreds of millions of yuan.

(07.05.2024)

[Read](#)

Inceptio Technology delivers intelligent heavy-duty trucks to Huatai Logistics.

(06.05.2024)

[Read](#)

L4 target

Not announced

Not announced

Not announced

Not announced

Goods Transport & TaaS ASIA

At a glance

SAIC



SAIC Hongyan, in collaboration with UTOPILOT, launched a 5G+L4 smart heavy truck that completed fully driverless testing & operations on public roads by 2023. Within 3 years, a fleet of ~300 truck was formed, making it the **world's largest commercial fleet of smart heavy truck**. By 7/2024, the fleet has accumulated **>10 million kilometers** of AD operation.

[Read](#)

NEOLIX



Nearly **1,000 Neolix delivery vehicles have been deployed** in nine countries and **over 40 cities worldwide**, with a cumulative mileage of more than 6 million kilometers by 2024. The shuttle may be compared with Nuro, which is currently focused exclusively on the US market.

[Update](#)
[Read](#)

DEEPRROUTE.AI



DeepRoute.ai **announced an autonomous medium-duty truck business line for urban logistics**. Having started a first commercialization project with Deppon Logistics, DeepRoute is **backed by Alibaba and its huge network** of ecommerce, logistics & community shopping, among others. Reads well.

[Read](#)

KARGOBOT



KargoBot was launched during Auto Shanghai 2023 **by MaaS giant DiDi** and focuses on a pilot vehicle approach with a human driver onboard and multiple L4 trucks following its lead. We will closely trace KargoBot's development.

[Update](#)
[Read](#)

Latest news

SAIC Hongyan's 5G+L4 Smart Heavy Truck to Begin Trial Operations in Danzhou.

(03.07.2024)

NEOLIX's unmanned delivery vehicles greenlight for road test in Nanjing.

(19.08.2024)

DeepRoute.ai collaborates with DEPPON LOGISTICS Co., LTD to expedite commercialization.

(20.06.2022)

KargoBot, Hengtongyuan Group set up joint venture to expand L4 autonomous trucking in Northwest China.

(09.09.2024)

L4 target

Not announced

Not announced

Not announced

Not announced

Goods Transport & TaaS

At a glance



DeepWay - a **subsidiary of Baidu** - plans to offer heavy Level-3-trucks by June 2023. The vehicles will have a range of 300 km, and in addition to a fast-charging function, it will also be possible to swap batteries in 6 minutes. The integration of fuel cells is targeted for the future.



TuSimple **withdrawn from the US market (and obviously from the autonomous trucking business as a whole)**. As a former leading self-driving truck company, TuSimple is now trying to move its assets to fund a new AI-generated animation and video game business. Weird.



TIER IV is a Japan-based company **specializing in Autoware-based AD solutions**. The company aims to make autonomous mobility technology scalable and accessible, collaborating globally to **advance AVs for different industries**. TIER IV participates in projects such as METI aimed at deploying robotaxis for transportation and autonomous trucks for logistics.

Latest news

DeepWay permitted to conduct cross-provincial autonomous heavy-duty truck pilot operations.

(08.03.2024)

[Read](#)

Investors rebel as TuSimple pivots from self-driving trucks to AI gaming.

(13.09.2024)

[Update](#)
[Read](#)

TIER IV tapped for METI initiative to develop robotaxis and autonomous trucks.

(20.08.2024)

[Read](#)

L4 target

2024-2026

Not announced






























Not announced

Goods Transport & TaaS. Europe.

Partnering & Value Chain, Level 4 Target & Latest News



























Goods Transport & TaaS EUROPE

LAYER 1				LAYER 2		LAYER 3		LAYER 4	LAYER 5		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport	3 rd party HD Maps	Cloud	V2X & Others
 		 		DAIMLER TRUCK		Not announced		Not announced	 		
		 		TRATON		  		 			
	 							   			


























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LAYER 1				LAYER 2		LAYER 3		LAYER 4	LAYER 5		
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider	Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport	3 rd party HD Maps	Cloud	V2X & Others
		 		 				  Uber Freight  			Not announced
								Not announced			Not announced
 								 			

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LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5					
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider		Infrastructure			
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport		3rd party HD Maps	Cloud	V2X & Others	
Not announced		 WAYVE		 MAXUS  JAGUAR				 ocado GROUP  dpd  ASDA			Microsoft		
	 tu simple 	 ZF  embotech  STRADVISION		CLEVON								Microsoft	
			 driveblocks TIER IV	 Applied Intuition  Apex.AI  D-Praxis		 pepper 		Not announced	Not announced		Not announced		
Core Business Partnership or supplier deal Investment Acquisition Parent / Subsidiary Update													

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LAYER 1		LAYER 2		LAYER 3		LAYER 4		LAYER 5				
Sensors / SoC / Computing HW		SW-Stack		Self-Driving Ready Vehicle		Fleet, Hub & Tele Operations		Transport & Platform Provider		Infrastructure		
Sensors	Chips, SoC, ...	Virtual Driver	Simulation, V&V, OS, ...	Vehicles	Components	Physical & Administration	Virtual Fleet Management	Digital freight matching / Transport		3 rd party HD Maps	Cloud	V2X & Others
										Not announced		
										Not announced		
						Not announced				Not announced		
<div>Core Business</div> <div> Partnership or supplier deal</div> <div> Investment</div> <div> Acquisition</div> <div> Parent / Subsidiary</div> <div> Update</div>												

Goods Transport & TaaS EUROPE

At a glance

Latest news

L4 target



DAIMLER
TRUCK



DTNA's **Cascadia trucks with an integrated Torc AV stack** are already **hitting the roads in the US** with a targeted go-to-market by 2027. Currently, there is **no roadmap for the domestic market** yet.

Daimler Truck and TORC Robotics select Aeva to supply advanced 4D LiDAR technology for series-production autonomous trucks.

(09.01.2024)

[Read](#)

Not announced



TRATON



As TRATON's partnership with TuSimple came to an end, **Scania, MAN, and Navistar will now work together with Plus** to intensify the development of L4 self-driving trucks. The companies will focus on hub-to-hub operations – using the **same AV stack across all major TRATON brands** is a reasonable approach.

Plus and Scania, MAN, and Navistar partner to accelerate global commercial deployment of Level 4 autonomous trucks.

(12.03.2024)

[Read](#)

Not announced



einride



The **Einride Pod** is unique from other self-driving trucks as there is **no driver's cab**. The pod currently operated in gated areas on fixed routes. Towards L4 with higher speeds on public roads there need to be leaps in development. However, Einride's ecosystem is unique.

DP World and Einride announce Middle East's largest deployment of electric, autonomous freight mobility, spearheading the region's sustainable transition.

(14.05.2024)

[Read](#)

Target reached
in gated areas
only



VOLVO



The **"Volvo VNL Autonomous"** fully redundant truck was unveiled in 2024 and will be **powered by Aurora**. In addition, **Volvo invested in Waabi** and thus betting on a second horse. The approach seems to make sense in order not to be dependent on an SDS provider in its self-driving roadmap.

The Volvo VNL Autonomous — Proving the Way Forward.

(20.05.2024)

[Read](#)

Not announced

Goods Transport & TaaS EUROPE

At a glance



Avride is the **rebranded, international division** of the robotaxi and delivery robot company **Yandex Self-Driving Group**. While international assets have been separated from Russian-owned Yandex assets, Avride said it's testing AVs (and probably the rover as well) in diverse ODDs across the globe, focusing on safety.



IVECO and Plus are jointly developing self-driving trucks and conducting **test drives on European highways**. **Pilot projects have already been announced** - so the two could be pioneers for autonomous trucks in Europe along TRATON.



Wayve does **not rely on HD maps** and **hand-coded rules** but **focuses on its deep and self-learning AI technology** based on cameras. The company raised \$1bn in 2024 to take its Tesla-like technology for self-driving to many carmakers. Let's see if delivery vehicles are still a targeted use case for Wayve.



ZF offers a **comprehensive portfolio for commercial vehicle automation** such as sensors and high-performance computers. While ZF has already **supplied L4 truck companies**, we are curious if ZF wants to become a full-stack provider with an own virtual driver - that would be ambitious as competition is strong.

Latest news

Yandex self-driving group rebrands its international division as Avride.

(04.08.2023)

[Read](#)

IVECO, Plus, dm-drogerie markt and DSV launch automated trucking pilot in Germany.

(15.11.2023)

[Read](#)

Asda and Wayve launch UK's largest self-driving grocery home delivery trial.

(17.04.2023)

[Read](#)

Clevon collaborates with ZF to orchestrate driverless last-mile delivery fleets.

(22.02.2023)

[Read](#)

L4 target

Not announced

Not announced

Not announced

Not announced

Goods Transport & TaaS EUROPE

At a glance



driveblocks develops a **modular; scalable AD software stack** for commercial vehicles. **It allows OEMs/Tier1 to integrate it with their vehicles and solutions in an open and flexible way.** The solution targets the EU market first and is a differentiating, but also ambitious approach compared to other players.



LOXO'S last mile delivery vehicle is reminiscent of some US and Chinese market players' solutions but is the **first vehicle of its kind made in Europe. Commercial success in Europe requires both a technically mature solution and a profitable business case.** In 2024, LOXO and Planzer announced a joint pilot based on an ID. Buzz, shifting away from the SPV.



Goggo builds a European network for middle and last mile delivery services. Mobileye and Oxbotica have been signed up - concrete details on the delivery services (e.g., vehicle type) are not yet known. We are curious to see where Goggo will position itself in the future ecosystem.



Starship delivery robots completed **>6mn autonomous deliveries.** It is **unlikely that these robots will become widely accepted for last mile delivery.** However, there could certainly be use cases in gated areas. Being a pioneer in the robot delivery space, more and more new players have entered the market.

Latest news

TIER IV paves the way for highway trucking with innovative reference design.

(02.05.2024)

[Read](#)

Joint pilot project 'Planzer – Dynamic Micro Hub with LOXO'.

(19.09.2024)

[Update](#)
[Read](#)

Pascual makes the first delivery in Spain for hospitality with an autonomous robot by Goggo Network [ES only].

(31.05.2023)

[Read](#)

Tallinn-based Starship Technologies raises €83.6 million to make the robot delivery take over the streets.

(06.02.2024)

[Read](#)

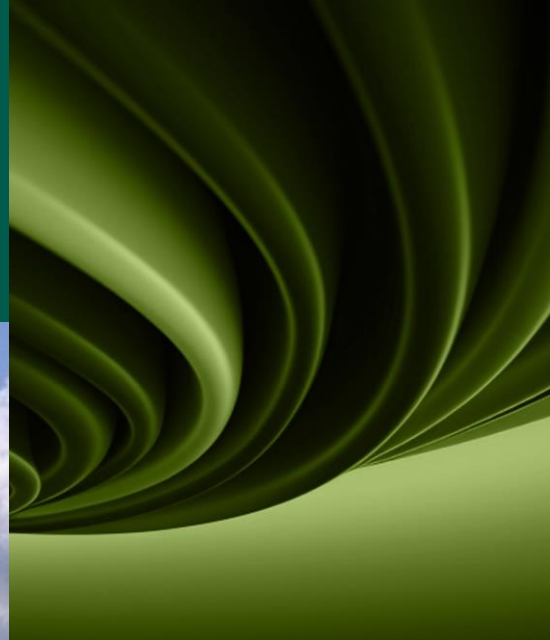
L4 target

Not announced

Not announced

Not announced

Reached at various locations



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